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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,655	10/02/2003	Choong-Un Kim	873.0125.U1(US)	9762
29683 7590 09/30/2008 HARRINGTON & SMITH, PC 4 RESEARCH DRIVE, Suite 202 SHELTON, CT 06484-6212			EXAMINER IP, SIKYIN	
			ART UNIT 1793	PAPER NUMBER
			MAIL DATE 09/30/2008	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/678,655	Applicant(s) KIM ET AL.	
	Examiner Sikyin Ip	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,6-11,13-16,20-22,26,27,36-48 and 52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,6-11,13-16,20-22,26,27,36-48 and 52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) ☐ Notice of References Cited (PTO-892) | 4) ☐ Interview Summary (PTO-413) |
| 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) ☐ Information Disclosure Statement(s) (PTO/SB/08) | 5) ☐ Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) ☐ Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-4, 6-11, 13-16, 20-22, 26, 27 and 36-48 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The transitional expression “consisting of” is found inconsistent with “including” in last two lines of claims 1, 8, 15, 16, 20, 26, 36 (lines 2-3), and 43. Therefore, it is interpreted as “the intermetallic interface including Sn islands and a composite structure without scallop formation.”

Claim Rejections - 35 USC § 103

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 8, 12-16, 20, 26, 27, 36, 37, 39, 41, 43-48, and 52 are rejected under 35 U.S.C. § 103 as being unpatentable over USP 5863493 to Achari et al (PTO-1449) or JP 200052083 in view of USP 5527628 to Anderson et al (PTO-1449) and further teachings of USP 5520752 to Lucey, Jr. et al and US 2002/0106528 to Jin et al.

Achari or JP 200052083 in abstracts discloses Sn-Ag-Cu-Au solder composition and solder applications for electronic parts except for the beta Sn phase, intermetallic size, and Sn island size. However, Anderson in col. 3, lines 16-29 discloses intermetallic compounds would uniformly distributed throughout beta Sn phase/island in the same field of endeavor or the analogous metallurgical art. Lucey in col. 4, lines 1-13 discloses intermetallic particles sizes are about 1-50 μm in conventional Sn based solders. Jin in [0038] discloses island diameter is preferably less than 10 μm which includes claimed island size. Therefore, it would have been obvious to one having ordinary skill in the art of the cited references at the time the invention was made to recognize solders of Achari or JP 200052083 would inherently possess the intermetallic compounds, beta Sn island, and their sizes as shown by Anderson, Lucey, and Jin because claimed intermetallic compounds, beta Sn island, and their sizes are material properties which would have been possessed by the solder composition.

In re Best, 195 USPQ, 430 and MPEP § 2112.01.

“Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established, In re Best, 195 USPQ 430, 433 (CCPA 1977). ‘When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not.’

In re Spada, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, the prima facie case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. In re Best, 195 USPQ 430, 433 (CCPA 1977)."

Claims 2-7, 9-11, 21, 22, 38, 40, and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over references as applied to claims above, and further in view of US 2003/0219623 to Kao et al.

The above references disclose the features substantially as claimed as set forth in the rejection above except for (Au, Cu)₆Sn₅. However, Kao in Figures 2-4 and 6-7 discloses (Au, Cu)₆Sn₅ would be formed among many other intermetallic compounds because of the solder composition. In re Best, 195 USPQ, 430 and MPEP § 2112.01.

Response to Arguments

Applicant's arguments filed June 17, 2008 have been fully considered but they are not persuasive.

Achari et al. disclose electrical solder compositions having, in weight percent, between 91.5-96.5% Sn, 2-5% Ag, 0.1-3%Ni, and 0-2.9% Cu, and having a microstructure with uniformly dispersed fine grains of Sn-Ni, Sn-Cu and Sn-Cu-Ni intermetallic phases.

Applicants argue that " Achari et al. thus relate to a different microstructure than that of the subject claims. "

But, Ni is included in instant rejected claims, claim 1, for example.

Achari et al. thus relate to a different microstructure than that of the subject claims. Achari et al. do not disclose or suggest an interface between the claimed solder and substrate consisting of a composite structure without scallop formation and consisting of grains and dispersed

Applicants argue that " ductile Sn islands. "

But, solder of Achari has the same elements and utilities as claimed. The same additive added to the conventional Ag-Cu-Sn solder as instant solder. It is the burden of applicants to show solder of Achari would not inherently form a composite structure without scallop formation and consisting of grains and dispersed ductile Sn islands.

Applicants' argument with respect to JP '083 is noted. Examiner reiterates the response as set forth in Achari above.

Applicants' argument in page 11, third full paragraph is noted. But, it is clear from instant claim 2 that claimed grains could include all possible solder elements recited in claims and it is not limited to one element.

Anderson et al. do not disclose or suggest an interface between the claimed solder and substrate consisting of a composite structure without scallop formation and consisting of

Applicants argue that " grains and dispersed ductile Sn islands, as claimed by Applicants. ~~Not does this reference~~ „

But, it is clear that scallop formation is excluded from instant claims. Therefore, references need not to disclose scallop formation. β Sn islands are clearly shown in Anderson (col. 3, lines 17-32).

Applicants argue that Anderson failed to disclose claimed solder additives. Anderson is merely cited to show β Sn islands for Ag-Cu-Sn solder alloys.

Applicants argue that Lucey and Jin failed to disclose claimed interface. Said references are merely cited to show particles and island sizes respectively.

Applicants' argument with respect to Kao is noted. But, Kao is cited to show $(\text{Au,Cu})_6\text{Sn}_5$ grains are known and would be formed with the disclosed solder elements.

Applicants' argument with respect to pages 17, 19, and 20 of instant specification is noted. But, unexpected results must be established by factual evidence. Mere argument or conclusory statements in the specification is not sufficient. In re Geisler (CA FC) 43 USPQ2d 1362 (7/7/1997) and Ex parte Gelles, 22 USPQ2d, 1318. Comparison must be done under identical condition except for the novel features of the invention. In re Brown, 173 USPQ 685 and In re Chapman, 148 USPQ 711. The

showing of unexpected results must be occurred over the entire claimed range. In re Clemens, 622 F.2d 1029, 206 USPQ 289, 296 (CCPA 1980). The scope of the showing must be commensurate with the scope of the claims. MPEP § 716.02(d), In re Tiffin, 448 F.2d 791, 792 (Fed. Cir. 1971), In re Coleman, 205 USPQ 1172, In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 778 (Fed. Cir. 1983), and In re Greenfield, 197 USPQ 227.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

All recited limitations in the instant claims have been meet by the rejections as set forth above.

Applicant is reminded that when amendment and/or revision is required, applicant should therefore specifically point out the support for any amendments made

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to the disclosure. See 37 C.F.R. § 1.121; 37 C.F.R. Part §41.37 (c)(1)(v); MPEP §714.02; and MPEP §2411.01(B).

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Ip whose telephone number is (571) 272-1241. The examiner can normally be reached on Monday to Thursday from 5:30 A.M. to 4:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King, can be reached on (571)-272-1244.

The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Sikyin Ip/
Primary Examiner, Art Unit 1793

September 28, 2008

Application Number 	Application/Control No.	Applicant(s)/Patent under Reexamination	
	10/678,655	KIM ET AL.	
	Examiner	Art Unit	
	Sikyln Ip	1793	